

## Discussion of "Anxiety Preceding a Heart Attack— Effect of Person"

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I was privileged to see this man as medical consultant. The patient had a typical anterior wall infarction. The electrocardiogram showed the characteristic signs of myocardial infarction. He had no other symptoms.

The general medical opinion about coronary occlusion, or coronary heart disease by its broader name, is that its etiology is multifactoral. It has, in addition, been suspected, although perhaps not admitted by the internists, that psychic factors are important in the genesis—particularly in the precipitation—of coronary occlusion. The driving personality, described years ago by Dr. Schneider in his first book, "The Image of the Heart" in 1956, predisposes a person to a coronary occlusion, in contrast to the meek, retiring, monk-like person. Thus, these psychic factors, which have been suspected for years, recently have been proved to be predisposing factors.

The coronary circulation is peculiar in many ways. One is that no blood flows through the coronary arteries of the left ventricle except in diastole. The amount of muscle catabolites produced by each contraction determines how much capillary dilatation there will be and then how much blood will flow through the capillaries. We really do not know, when we stimulate the sympathetic nervous system, whether there is vasoconstriction or vasodilatation; in other words, whether there is a vasoconstriction *relative* to the vasodilatation produced by the increased needs of the heart. Therefore, we do not know whether the catecholamines actually constrict or dilate coronary arteries.

Dr. Schneider referred to the heart as an endocrine organ. The sympathetic terminals in the heart and in other parts of the body do release catecholamines into the heart muscle for their action in constricting blood vessels, stimulating the heart rate, increasing the strength of the heart beat, etc. These catecholamines are not necessarily synthesized in the nerve cell body. They may be synthesized in the nerve endings themselves. The nerve endings are capable of picking up tyrosine from the blood, converting it to dopa and dopamine and finally, norepinephrine, and in this way acting as an endocrine organ. In other words, just as the adrenal medulla picks up tyrosine and converts it eventually into epinephrine which is released by nerve action, so too, this same process goes on throughout the body at the sympathetic nerve endings themselves. It may go on in the neuronal body, too, but the vast bulk of this metabolism goes on at the nerve endings where these catecholamines are stored in granules and eventually released for activity.

It is not only the action of the catecholamines on the heart itself that we must be concerned with, but the action of these substances in the

body as a whole. The raising of the blood pressure, the speeding up of the heart, the increased work of the heart and, therefore, the increased demands on the coronary circulation and the possible decreased supply of blood to the heart, are all important factors.

In our laboratory we have been interested in essential hypertension. The entire process I described is exaggerated in the person with essential hypertension. We can show that if you infuse norepinephrine into hypertensive as against normotensive subjects, there is a tremendous increase in reactivity in the patient with essential hypertension and *not* in the patient with renal or other types of hypertension.

These are complex processes, but they are of the utmost importance in vascular regulation and probably of importance, although the exact mechanism is still not known, in the genesis of coronary occlusion.

## II. W. HORSLEY GANTT

To attempt to make the bridge between the laboratory and the clinic is tremendous work. Working with animals experimentally is very different from clinical observation of patients. We have the animals under control, and we can use them to the best advantage in the experiments in a way that is not possible with patients in a clinic.

Pavlov attempted to explain psychiatric disorders—paranoia, schizophrenia, melancholia, and mania—by analogies to what he found in the study of his experimental dogs. Although some of this work was valid, a large part of it remains to be confirmed.

Dr. Schneider has made the bold attempt to apply the principle of Effect of Person in one of his clinical cases. He has pointed out how people who were involved with this patient had effects on his symptoms, especially the cardiovascular functions.

In our many years of studying the dog, we have found that another individual, whether dog or human, has a marked influence on the behavior of the dog. Sometimes this influence is not apparent in the gross motor behavior, but if we study cardiovascular functions such as heart rate, blood pressure, blood flow, and even coronary flow we find that one individual profoundly influences what goes on in the autonomic system of another individual.

In order to evaluate the clinical significance of principles found in the laboratory it is necessary to make observations, comparisons and obvious analogies as Dr. Schneider has done.